



## **“Norway - 50 years in space” and beyond**

2012 celebrates the beginning of the Norwegian space adventure starting with the launch of the first sounding rocket, Ferdinand I, from Andøya Rocket Range (ARR) August 18th, 1962. Since then, Norwegian space activity has grown, both at home and internationally. There have been large benefits for industry, for research and development, as well as society in general. Norwegian space activity is now represented on all continents, and is a large export industry.

This national event will be celebrated at Andøya Rocket Range where a number of national and international guests will be invited to a 4 day long (August 16<sup>th</sup>-19<sup>th</sup>) event that includes scientific seminars, space educational seminars, a full blown “Space Circus”, Whale safari, a barbeque and a sounding rocket launch. National and international news- and television reporters will build the rocket. In addition to the instruments, the ESA astronaut Christer Fuglesang and the winning team from the national Teddynaut competition for Junior High School will integrate their Teddynaut into it.

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In its 50th year, Andøya Rocket Range and the Norwegian sounding rocket community is once again a rising star. After years of recess and declining funding for sounding rocket missions, two new projects were given “good to go” in December 2011 by the Norwegian Space Centre and the Norwegian Research Council.

ICI-4 will be the fourth sounding rocket project lead by Professor Jøran Moen from the University of Oslo. The two-stage rocket will be launched from Ny-Ålesund at Svalbard, late 2013. The single-stage MAXIDUSTY I will mark the re-entry of Tromsø University into the sounding rocket community. Launch will take place from Andøya during the summer of 2013. Both will be based on the Hotel Payload concept from Andøya Rocket Range, and they will be built, integrated and tested on-site at ARR.

ARR is also working together with the Norwegian company NAMMO and the Norwegian Space Centre to investigate the possibility of establishing Andøya Rocket Range as a future mainland European launch site for small satellites. This will be a service dedicated to low, polar SSO satellites with a maximum height of 600km. The on-going investigations have payload weights of 10-40 kg as their main focus; rail launched using our proposed hybrid North Star Launch Vehicle from the existing infrastructure at Andøya. First launch might take place in 2017.

One important milestone in this project is the development of the environmentally friendly 2-stage hybrid rocket North Star I (NS-I). The NS-I will provide in-flight thrust regulation and thrust vector control when needed. The NS-I will be based on a modular concept build around an Improved Orion equivalent as the second stage. The first stage will be a cluster of four of these innovative rocket engines. The full-scale version is planned to be ready for testing in 2014, and is currently being designed by NAMMO in Norway with support from ESA.

Norway also has a well-functioning student satellite program – lead by Andøya Rocket Range. As we speak, three CubeSats are currently being worked at. The one closest to launch is the HiNCube made by Narvik University College. At the University of Oslo they are working at their 2U space weather demonstrator – CubeSTAR and in Trondheim, at the Norwegian University of Science and Technology (NTNU) their 2U CubeSat NUTS is taking shape.

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